



Chloride

Thiocyanate-Hg Colorimetric

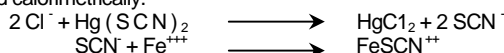
Quantitative determination of chloride ion

Store at 2-8°C

For *in-vitro* diagnostic use only.

PRINCIPLE OF THE METHOD

The quantitative displacement of thiocyanate by chloride from mercuric thiocyanate and subsequent formation of a red ferric thiocyanate complex is measured calorimetrically.



The intensity of the color formed is proportional to the chloride ion concentration in the sample^{1,2,3,4}.

CLINICAL SIGNIFICANCE

It is important clinically the determination of chloride due regulation of osmotic pressure of extra cellular fluid and to its significant role in acid-base balance. Increases in chloride ion concentration may be found in severe dehydration, excessive intake of chloride, severe renal tubular damage and in patients with cystic fibrosis.

Decrease in chloride ion concentration may be found in metabolic acidosis, loss from prolonged vomiting and chronic pyelonephritis^{2,3,4}. Clinical diagnosis should not be made on a single test result; it should integrate clinical and other laboratory data.

REAGENTS

R	Mercuric thiocyanate	4 mmol/L
Thiocyanate-Hg	Ferric nitrate	40 mmol/L
	Mercuric nitrate	2 mmol/L
	Nitric acid	45 mmol/L
CHLORIDE CAL	Chloride aqueous primary standard 125 mmol/L	

PRECAUTIONS

Mercury(II) thiocyanate :Harmful (Xn): 1120121122:Harmful by inhalation, in contact with skin and if swallowed. R33: Danger of cumulative effects. S13: Keep away from food, drink and animal feeding stuffs. S28: After contact with skin, wash immediately with plenty of water. S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S60: This material and its container must be disposed of as hazardous. S61: Avoid release to the environment Refer to special instructions/safety data sheets.

PREPARATION:

All the reagents are ready to use.

STORAGE AND STABILITY

All the components of the kit are stable until the expiration date on the label when stored tightly closed at 2-8°C, protected from light and contaminations prevented during their use.

Do not use reagents over the expiration date.

Signs of reagent deterioration:

- Presence of particles and turbidity
- Blank absorbance (A) at 480 nm ≥ 0.15.

ADDITIONAL EQUIPMENT

- Spectrophotometer or colorimeter measuring at 480 nm.
- Matched cuvettes 1.0 cm light Path
- General laboratory equipment

SAMPLES

- Serum, plasma, CSF, sweat and other body fluids^{1,2}. Free of hemolysis and separated from cells as rapidly as possible. Anticoagulants such as oxalate or EDTA are not acceptable they will interfere with results.
- Urine: Collect 24-hour urine specimen in chloride free containers. Dilute a sample 1/2 in distilled water. Mix Multiply results by 2 (dilution factor). Stability of the sample: Ion chloride is stable 1 week at room temperature (15-25°C), in refrigerator (2-8°C) or frozen (-20°C) temperatures.

PROCEDURE

- Assay conditions:
Wavelength: 480 (440-500) nm
Cuvette: 1 cm. light path
Temperature 37°C /15-25°C
- Adjust the instrument to zero with distilled water.
- Pipette into a cuvette:

	Blank	Standard	Sample
R (mL)	1.0	1.0	1.0
Standard (μL)	—	10	—
Sample (μL)	—	—	10

- Mix and incubate for 5 min at 37°C /15-25°C.
- Read the absorbance (A) of the samples and Standard, against the Blank the color is stable for at least 30 minutes.

CALCULATIONS

$\frac{(A)_{\text{Sample}}}{(A)_{\text{Standard}}} \times 125$ (Standard conc.) = mmol/L chloride in the sample

Urine 24 h: $\frac{(A)_{\text{Sample}}}{(A)_{\text{Standard}}} \times 125 \times \text{vol. (dL) urine/24 h}$ = mmol/24 h chloride

Conversion factor: mmol/L = mEq/L

QUALITY CONTROL

Control sera are recommended to monitor the performance of assay procedures: ATLAS H Normal and Pathologic. If control values are found outside the defined range, check the instrument, reagents and calibrator for problems. Each laboratory should establish its own Quality Control scheme and corrective actions if controls do not meet the acceptable tolerances.

REFERENCE VALUES¹

Serum or plasma: 95 -115 mmol/L CSF: 95 -110 mmol/L
Urine: 110 - 250 mmol/24h Sweat: Up to 60 mmol/L

These values are for orientation purpose; each laboratory should establish its own reference range.

PERFORMANCE CHARACTERISTICS

Measuring range: From detection limit of 1.13 mmol/L to linearity limit of 130 mmol/L.

If the results obtained were greater than linearity limit, dilute the sample 1/2 with distilled water and multiply the result by 2.

Precision:

	Intra-assay (n=20)		Inter-assay (n=20)	
Mean (mmol/L)	90.7	106	91.6	108
SD	0.64	0.73	0.69	0.81
CV %	0.70	0.69	0.76	0.74

Sensitivity. 1 mmol/L = 0.006 A.

Accuracy: Results obtained using ATLAS reagents did not show systematic differences when compared with other commercial reagents. The results obtained using 50 samples were the following:

Correlation coefficient (r): 0.99

Regression equation: $y=0.9823x+2.3006$

The results of the performance characteristics depend on the analyzer used.

INTERFERENCES

Hemolysis. Anticoagulants other than heparin. Bilirubin up to 120 mg/L, bovine serum albumin up to 150 g/L and triglycerides up to 6 g/L did not significantly alter the assay⁵. A list of drugs and other interfering substances with chloride determination has been reported by Young et al⁶

NOTES

- It is recommended to use disposable material. If glassware is used the material should be scrupulously cleaned with H₂SO₄ - K₂Cr₂O₇ Solution and then thoroughly rinsed it with distilled water.
- Most of the detergents and water softening products used in the laboratories contains chelating agents. A defective rinsing will invalidate the procedure.
- Avoid the contact with metal materials.
- Calibration with the aqueous standard may cause a systematic error in automatic procedures. In these cases, it is recommended to use a serum Calibrator.
- Use clean disposable pipette tips for its dispensation.

BIBLIOGRAPHY

- Miller W.G. Chloride. Kaplan A at al. Clin Chem The C.V. Mosby Co. St Louis. Toronto. Princeton 1984;1059-1062 and 417.
- Ibbod F A. at al. New York Academic Press 1965:101-111.
- Schoenfeld R G at al. Clin Chem 1964 (10): 533-539.
- Levinson S S. et al. In Faulkner W R et al editors. (9) AACC 1982:143-148.
- Young DS. Effects of drugs on Clinical Lab. Tests, 4th ad AACC Press, 1995.
- Young DS. Effects of disease on Clinical Lab. Tests, 4th ad AACC 2001. T Burns A at al. Tietz Textbook of Clinical Chemistry, 3rd ad AACC 1999. 8.Tietz N W at al. Clinical Guide to Laboratory Tests, 3rd ad AACC 1995.

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